

The background of the entire page is a complex, abstract geometric pattern. It consists of numerous red hexagons of varying sizes, some of which are 3D cubes. These shapes are interconnected by a network of thin, grey, angular lines that create a sense of depth and movement. The pattern is most dense in the top right and bottom right corners, with more open space on the left side where the text is located.

**R H O D E
I S L A N D
C O L L E G E**

**SOCIAL POLICY HUB FOR
EQUITY RESEARCH IN EDUCATION**

STEM PATHWAYS FOR RHODE ISLAND'S HISPANIC STUDENTS

**BARRIERS, OPPORTUNITIES, AND PROMISING PRACTICES
FROM K-12 TO COLLEGE**

**ADRIENNE C. GOSS &
ALYSSA GRAHAM**

September 2023



About SPHERE

Mission

The mission of SPHERE is to engage Rhode Island College students and faculty, in partnership with Rhode Island community members, in conducting and disseminating research for equitable educational and social policies. SPHERE endeavors to help Rhode Islanders understand and become more involved in education policy decisions.

Vision

SPHERE aspires to be a leading education and social policy institute in Rhode Island. As a policy hub, SPHERE connects with Rhode Island's education stakeholders in multiple spheres of influence by linking research, policy, and practice.

Suggested citation

Goss, A. C. & Graham, A. (2023). STEM pathways for Rhode Island's Hispanic students: Barriers, opportunities, and promising practices from K-12 to college. Social Policy Hub for Equity Research in Education.



Acknowledgments

The authors gratefully acknowledge the contributions of several individuals and organizations who made this work possible:

Kristen Procopio for research and data support.

Joshua Seguí-Rodríguez, Ducha Hang, Anabela Resende de Maia, and Anna Cano Morales for feedback on drafts of this document.

The Latino Policy Institute for thought partnership on this project.

The Hispanic Serving Institution (HSI) Committee at Rhode Island College (RIC) for its ongoing work to elevate and advocate for the needs of RIC's Hispanic population.

Thank you for lending your time and energy to support this research. We hope that it will be useful in advancing equitable educational opportunities for Rhode Island youth.

This material is based upon work supported in part by the National Science Foundation under EPSCoR Cooperative Agreement #OIA-1655221.



Table Of Contents

Executive Summary	1
Introduction	2
Why Focus on STEM?	4
Barriers and Opportunities	7
Promising Practices	17
Recommendations	21
End Notes	26
References	27



Executive Summary

Rhode Island's future social and economic health requires a thriving Hispanic population. Along the P-20 education pipeline, education stakeholders should work to reduce systemic barriers and increase opportunities for Hispanic students to excel in STEM fields. With higher median earnings and lower unemployment, STEM careers have the potential to provide economic security to families. Unfortunately, Rhode Island's public schools have failed to prepare many of the state's Hispanic students for postsecondary success in STEM. This report draws on multiple data sources, including a review of empirical studies, policy documents, and national and local data on academic performance to address the following questions:

- What barriers and opportunities exist to Rhode Island's Hispanic students' persistence in STEM fields?
- What promising practices might equip Rhode Island's Hispanic-Serving Institutions (HSIs) to support Hispanic students in STEM along the P-20 pipeline?


Financial investments, hiring and training culturally competent educators, and supportive programs and policies for Hispanic students can increase the chances that Hispanic students will complete a postsecondary credential in a STEM field.



Introduction

The United States has long prioritized science, technology, engineering, and mathematics (STEM) education. An early, significant investment in STEM was sparked when the Soviet Union successfully launched the satellite Sputnik. In response to this event, the U.S. passed the 1958 National Defense Education Act to increase funding in science, math, and modern foreign languages. This investment impacted education at all levels (e.g., identification of gifted students at the K-12 level, and loans for academically capable students to attend college), but not necessarily across demographic backgrounds. In recent years, the focus on equity in education has led to initiatives to correct the lack of representation in STEM fields. For instance, at the federal level in 2016, the Obama Administration introduced “STEM for All,” a variety of initiatives that prioritized access to STEM education for women and underrepresented racial and ethnic groups. More recently in 2022, the Biden Administration introduced “YOU Belong in STEM,” which seeks to cultivate positive conditions for STEM learning for all students. Investing in students who historically have not been included in STEM education is critical to the future of our nation. Given that Hispanic students are the fastest growing student population in the U.S., we cannot meet the continually growing demands of the workforce, particularly of the STEM workforce, without increasing the number of Hispanic workers with postsecondary credentials in STEM (Santiago et al., 2015).

Relatedly, with a population that is 17% Hispanic, Rhode Island’s future social and economic health requires a thriving Hispanic population.



STEM careers have the potential to provide economic security to families, with higher median earnings and lower unemployment, but Hispanic people are underrepresented in STEM fields (Kennedy et al., 2021; Okrent & Burke, 2021). Systemic inequities have made it difficult for many of Rhode Island's Hispanic youth to receive a quality education that would lead to a STEM career. This report draws on multiple data sources, including a review of empirical studies, policy documents, and national and local data on academic performance to address the following questions:

- What barriers and opportunities exist to Rhode Island's Hispanic students' persistence in STEM fields?
- What promising practices might equip Rhode Island's Hispanic-Serving Institutions (HSIs) to support Hispanic students in STEM along the P-20 pipeline?

Because roughly two out of three Hispanic college students attend Hispanic Serving Institutions (About HACU, n.d.), we draw heavily from the literature on HSIs and on research that focuses on the Hispanic population. Except when citing a specific research study that chooses to use a different term (e.g., Latino, Latinx), throughout this report we follow the lead of the Hispanic Association of Colleges and Universities (HACU), and their use of the term Hispanic in reference to people whose ancestors lived in the U.S. before it was a nation, recent immigrants, and those with roots in Spain, Mexico, Puerto Rico, Cuba, and other Central and South American countries (HACU, n. d).¹ Hispanic people are diverse racially, culturally, socioeconomically, and linguistically, and represent a multitude of nationalities. Our attempts to make inferences from existing data and research will undoubtedly fail to fully encompass the unique social and political histories and experiences of people's connections to what is now known as the United States, and the institutions therein.




Why Focus on STEM?

The term STEM is used to describe the integration of science, technology, engineering, and mathematics into an educational curriculum (Watson & Watson, 2013). STEM education at the K-12 level falls under two broad categories: academic and applied (Gottfried & Bozick, 2016). Academic STEM courses include math and science courses that "comprise the traditional academic curriculum, such as algebra, geometry, calculus, biology, chemistry, and physics (i.e., the S and M of STEM)" (Gottfried & Bozick, 2016, p. 179). Applied STEM courses include Scientific Research and Engineering (SRE) courses (e.g., surveying, electrical engineering, structural engineering, computer-assisted design/drafting); and Information Technology (IT) courses (e.g., computer science, C++ programming, visual basic programming, data processing). These are the T and E of STEM. SRE and IT

Table 1: Examples of Academic and Applied STEM Course Offerings at the K-12 Level

Science & Math: Academic STEM Courses	Technology & Engineering: Applied STEM Courses	
Algebra, Geometry, Calculus, Biology, Chemistry, Physics	Scientific Research and Engineering (SRE)	Information Technology Courses (IT)
	Surveying, electrical engineering, computer-assisted design/drafting	Computer science, C++ programming, visual basic programming, data processing


Gottfried & Bozick, 2016



courses, collectively, are referred to as applied STEM courses (Gottfried & Bozick, 2016). Elements of engaging STEM programs include rigorous mathematics and science instruction, promotion of engineering design and problem solving, hands-on, collaborative, and inquiring approaches to learning, and use of appropriate technologies such as modeling and simulation (Kennedy & Odell, 2014). Beyond the classroom, STEM programs can provide opportunities for students to connect with STEM educators and personnel in the workforce while reflecting on current advancements in the field (Kennedy & Odell, 2014).

Access to STEM and Postsecondary Decisions

Access to STEM education correlates with higher rates of postsecondary enrollment and subsequent interest in majoring in a STEM field. STEM fields provide more stability in terms of job security and earning potential than non-STEM fields (Okrent & Burke, 2021). Yet many students do not leave high school prepared for these fields. The most significant predictor of postsecondary STEM success is the level of math or science courses taken in high school. A review of research found that this relationship was strong across racial and ethnic groups (Hinojosa et al., 2016). STEM courses in high school influence students' decisions about enrollment and majors in college. One study found that among students who ultimately enrolled in a four-year college, there was a significant, positive relationship between applied STEM course-taking in high school and declaring a STEM major in college (Gottfried & Bozick, 2016). Those students who took any combination of applied STEM in high school had greater odds of declaring a technology or engineering major over a science or math major and over a non-STEM major (Gottfried & Bozick, 2016). Interestingly, the results differed for those who enrolled in a




two-year college. Among these students, there was only minor evidence that taking IT and SRE courses in high school predicted a higher chance of declaring a technology or engineering major. Additionally, students who took both SRE and IT courses—applied STEM courses—were more likely to *not* continue to college (Gottfried & Bozick, 2016). Such findings may seem confusing, but it is worth noting that these applied courses likely help students enter the workforce in STEM fields that do not require a degree (e.g., carpenters, machinists, mechanics, electricians, production workers). Moreover, although there is a correlation between the level of STEM courses and college enrollment, this does not mean that the relationship is a causal one. Many students who are on track with college-preparatory STEM coursework do not enroll in college at all (see Ogut et al., 2021). These findings suggest that enrollment in coursework is not enough to increase postsecondary enrollment, or more specifically, majoring in a STEM field.



Barriers and Opportunities to Rhode Island's Hispanic Students' Persistence in STEM fields

In order to increase the number of Hispanic students in STEM, we need to prepare them in middle and high school for a seamless transition to postsecondary education and careers. Although many students who do not enroll in an IHE after high school may still enter a STEM field, the highest paying positions often require a postsecondary credential. Unfortunately, Rhode Island's schools are not adequately preparing Hispanic students for postsecondary success.

Rhode Island's K-12 public schools historically have failed to provide an equitable education to all students since their inception (Goss, 2020). Racial segregation and exclusion in the state's public education system and racist and exclusionary housing policies are among the factors that have contributed to some districts having higher concentrations of nonwhite students and students experiencing economic hardship. These factors increase the likelihood that students will attend under-resourced schools and perform at lower levels academically as measured by standardized exams. In most states, public education is funded by a combination of local, state, and federal revenue. A report from the Rhode Island Public Expenditure Council determined that Rhode Island relies more on local funding for public schools compared to the nation overall, leaving communities with lower overall incomes and thereby lower tax revenues more reliant on state funding (RIPEC, 2022). The state provides more than half of the funding for four districts (Providence, Pawtucket, Central Falls, and Woonsocket), each of which has relatively large proportions of Hispanic students. With the exception of Providence, which spends slightly more



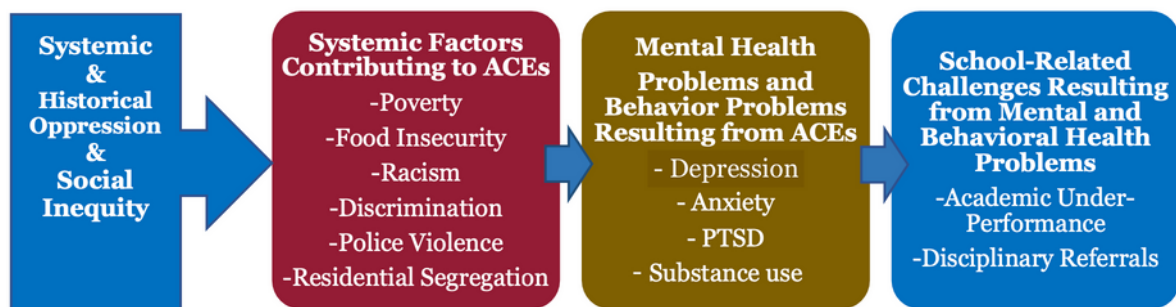
than the statewide per pupil amount, each of these districts ranked among the bottom ten in the state for per pupil spending. Although some relatively wealthy districts also have spending levels among the bottom ten, students with the greatest needs benefit from additional resources.

The impact of failing to invest in public education has been starkly evident in Providence for decades. A 2019 review of the Providence Public School District found “unusually deep, systemic dysfunctions in PPSD’s education system that clearly, and very negatively, impact the opportunities of children in Providence” (Johns Hopkins, 2019, p. 2). Most students were not learning at grade level, teachers were demoralized, parents were marginalized, principals were powerless, and facilities had deteriorated. The problems noted in the report are long-standing. In 1993, the PROBE Commission conducted a comprehensive, 18-month-long study of the district that showed students were not receiving an equitable education (Eddy, 1993). Because more than one third of the state’s Hispanic public school students attend school in Providence, these structural deficiencies unjustly impact a significant portion of the state’s Hispanic student population.


Whether at the K-12 or postsecondary level, many Hispanic students face similar challenges with economic stability and a need for support navigating educational systems. About one third of Hispanic children live below the poverty line, and over one third live in neighborhoods of concentrated poverty. Data that indicate educational disadvantages for Latino students are likely a result of challenges due to economic hardship (Murphey et al., 2014). Students living in neighborhoods with high concentrations of poverty also have increased exposure to traumatic events, which negatively impacts mental health and wellness. One Rhode

Island-based study found that nearly two thirds (64%) of first- and second-generation Latinx high school students met the clinical cutoff for a likely diagnosis of anxiety disorder (Brabeck, 2020).² Most students also reported experiencing discrimination because of their race or ethnicity. Some students used substances to cope with traumatic events and mental health symptoms.³ All of these factors contribute to school-related academic and behavioral challenges (see Figure 1).

Figure 1. Social Context, ACEs, and Outcomes for Minoritized Youth



Brabeck, 2020



As noted in Figure 1, systemic and historical oppression and social inequity have a deleterious impact on school-related outcomes. Although language can be a barrier for Hispanic students, it is a myth that language is the primary barrier, given that first-generation immigrant youth tend to outperform subsequent generations who were born in the U.S. and grew up speaking English (Gándara, 2017). In fact, as of 2013, more than 90% of Latino children are U.S.-born citizens (Murphey et al., 2014). Granted, some of these children still may grow up speaking English as their second language. Poverty, however, and the challenges that accompany concentrated poverty, play a more influential role in students' academic performance.

Academic Performance of Rhode Island's Hispanic Students in STEM at the K-12 level

Academic performance on standardized tests is the most common measure that we have for how well students are learning. The systemic inequities that Hispanic students in Rhode Island face contribute to their lower levels of academic performance on every standardized indicator, compared to overall state averages. In 2021, 51% of Hispanic students in Rhode Island did not meet expectations on the state's mathematics assessments, compared to 33% of all Rhode Island students. (See Table 2.)

Before the COVID-19 pandemic disrupted in-person learning within school buildings, about half of Hispanic students performed at or above the basic level of proficiency on national assessments in 4th grade and 8th grade reading, and less than half performed at or above the basic level in 8th grade math. Although their performance was better on the 4th grade math exam (with 68% scoring at or above basic level), it was below the overall performance in the state (81%). (See Table 3.)



Table 2. Proficiency on Math State Assessments, 2021

	Not Meeting Expectations	Partially Meeting Expectations	Meeting Expectations
All RI Students	33	45	19
Hispanic RI Students	51	40	8

Note: Measures performance on the 2021 RICAS, Dynamic Learning Maps (DLM), and SAT assessments combined. The Rhode Island Department of Education (RIDE) reminds viewers of these results to keep in mind that student performance may have been influenced by disruptions due to the COVID-19 pandemic.

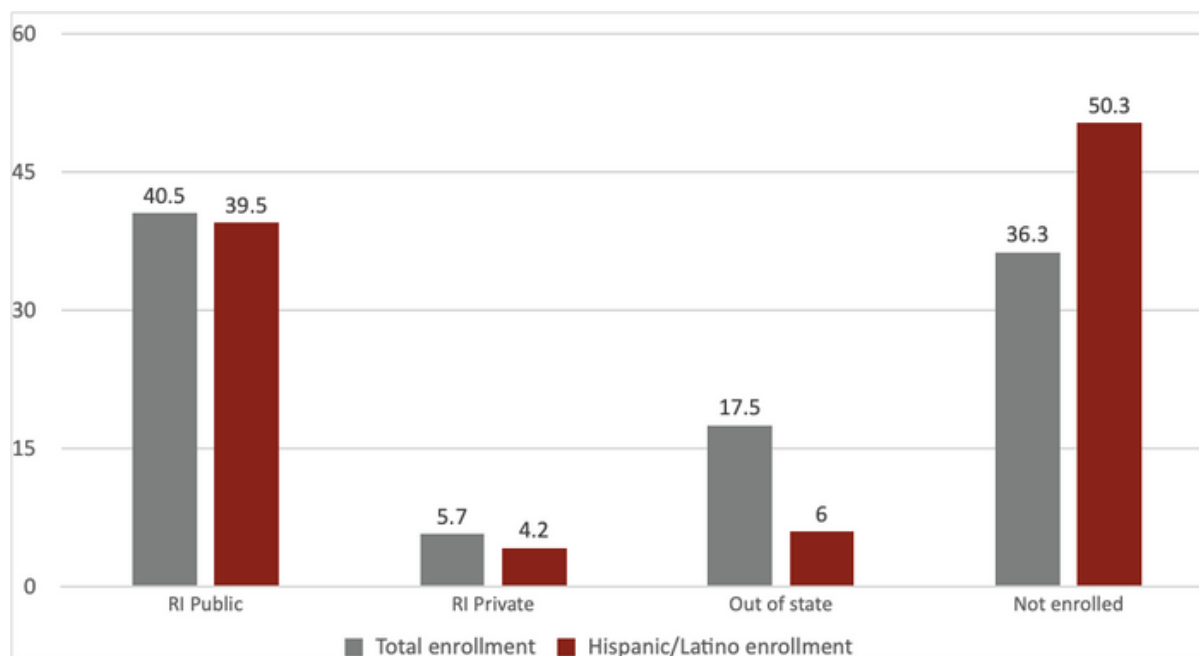
Table 3. Rhode Island National Assessment of Educational Progress (NAEP) Performance by Student Group, 2019. Percent at or above Basic Level of Proficiency

	Reading		Math	
	4th Grade	8th Grade	4th Grade	8th Grade
All RI Students	66	71	81	64
Hispanic RI Students	50	52	68	44


Source: reportcard.ri.gov. The National Assessment of Educational Progress is an exam given every two years to a nationally representative sample of students.

The data we have on student performance indicate that Rhode Island schools are failing to educate and graduate Hispanic students who are ready for college. Roughly one out of four Hispanic students in Rhode Island do not graduate high school within four years. Among those that do graduate, half enroll in an institution of higher education (IHE) within one year of high school graduation. (See Figure 2.)

Figure 2. Rates (%) of Postsecondary Enrollment within 1 Academic Year for 2019-20 Rhode Island High School Graduates



Source: reportcard.ri.gov



College enrollment is not necessarily an indicator of a successful high school experience, but it is worth noting that considerably more Hispanic students (50.3%) choose not to enroll compared to the average non-enrollment rate across the state (36.3%). It is also important that we know why Hispanic students are not enrolling: nationally, 66% of Hispanics who entered the workforce or military after high school reported that their need to support their families was the reason for not enrolling in college (Krogstad, 2016).

Many students who do enroll face a number of challenges. Complete College (2012) determined that in Rhode Island, 81.4% of Hispanic students enrolling in two-year institutions required remediation, compared to 69.7% of all first-year Rhode Island students enrolling in two-year institutions. (Data for four-year institutions was not provided.) Of course, both of these remediation rates are incredibly high compared to the national remediation rates of 58.3% of Hispanic students and 51.7% of all first-year students enrolling in two-year institutions, showing that college preparation in Rhode Island schools is a problem for all students, not just Hispanic students. Remedial courses are a barrier to completing college; they are costly, time-consuming, and typically do not count toward degree requirements. Moreover, research shows that students who skip remedial work do just as well in their gateway⁴ courses as those who took remedial courses (Complete College, 2012). Instead of focusing on what students lack, IHEs can leverage students' strengths, particularly of those who speak Spanish, by offering opportunities for them to receive college credit for linguistic abilities and other learning experiences such as research, peer mentoring, or participation in learning communities.




Support At the K-12 Level

Fortunately, research provides ample guidance for how to support Hispanic students and families; we only need the will to invest in and sustain these types of supports at both the K-12 and postsecondary levels. Wraparound services for students and families experiencing economic hardship, early childhood education, and effective school desegregation are some ways to combat the challenges of concentrated poverty (Gándara, 2017). Dual language instruction in math and science courses can contribute significantly to students' overall academic success (Museus et al., 2011). Dual language instruction preserves students' home language as they work to acquire a new language (e.g., English). Counseling services that guide students into the rigorous courses that they need can help keep students on track academically (Gándara, 2017; HACU, n. d.). Such services are critical for middle and high school students who do not have the cultural capital—the “know-how”—of navigating schools and other institutions. Connecting to out-of-school activities to form relationships with peer groups can help students feel connected to the school. Recruiting Hispanic male teachers, counselors, and program directors expands students' social capital, and may also help Latino male students in particular (Gándara, 2017). This may be especially important in Rhode Island where there are so few Hispanic teachers.


Support At the Postsecondary Level

The supports needed at the K-12 level are reflected at the postsecondary level. When considering how to support Hispanic students in IHEs, the following numbers should be kept in mind:

- 
- 44% of Latino students are first-generation students;
 - 62% work while enrolled;
 - 51% begin their bachelor's degrees at a two-year institution;
 - 69% enroll in public institutions; and
 - 71% are from families earning \$63k or less per year. (Martinez & Santiago, 2020)

In short, the needs and experiences of Hispanic students do not align with some mainstream conceptions of a college student; many are juggling work and financial responsibilities, and less than half initially enroll in a four-year institution.

Institutional agents—individuals who can deploy resources, networks, and positional authority—can promote Hispanic student success. These agents include faculty, administrators, and staff as mediators of Hispanic student success in HSIs (Garcia & Ramirez, 2018). Institutional agents are in the position to provide students with social and institutional support, which may come in the form of highly valued resources, opportunities, privileges, and services (Bensimon et al., 2019). Their expertise is used to mentor students and adapt the field of STEM to be responsive to incoming Hispanic and other historically underrepresented minority groups (Bensimon et al., 2019). The quality of student-faculty interactions and encouragement from faculty are influential to the academic performance of Hispanic students (Cole & Espinoza, 2008). Hispanic students also benefit from connections to supportive ethnic-based STEM student organizations such as the Society of Hispanic Professional Engineers (SHPE) or the Society for Advancement of Chicanos/Hispanics & Native Americans in Science (SACNAS) (Lane, 2016; Revelo, 2015; SACNAS, 2021). These programs allow Hispanic students to take on leadership roles while feeling connected to their peers. One study found that participation in undergraduate research experiences helped Hispanic/Latinx



students gain professional skills (e.g., networking, presenting research); psychosocial benefits (e.g., clarity about priorities in the working environment); and increased confidence in their ability to succeed in STEM (Frederick et al., 2021). Participation in learning communities may help to improve retention and grades (Anderson & Blackenberger, 2023). These are just some of the ways that IHEs can make the college experience more supportive.

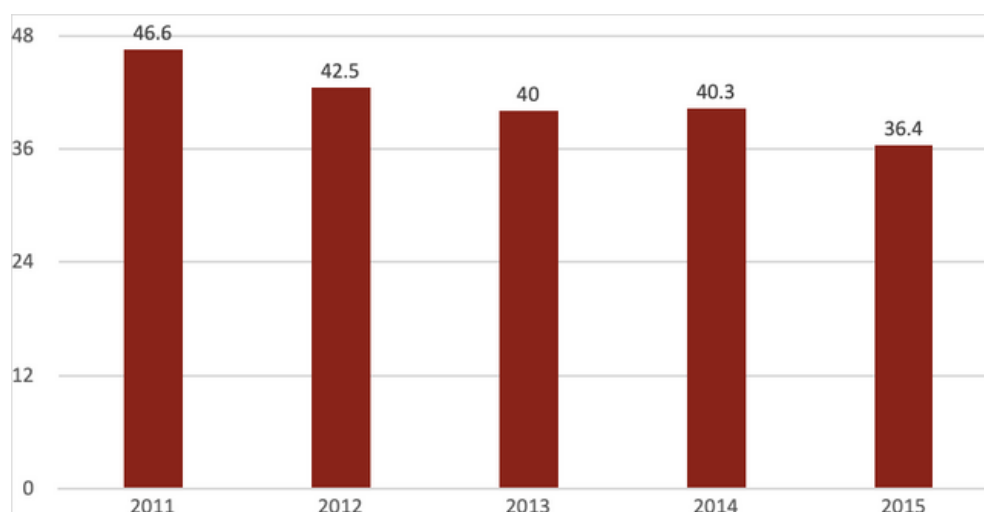
Summary

In summary, access to STEM curriculum is a necessary but insufficient requirement to increase Hispanic students' participation in STEM at the postsecondary level. STEM courses in high school influence students' decisions about enrollment and majors in college, but attention must be paid to other systemic factors that negatively affect students' ability to persist academically. Economic supports for students (and their families) along the P-20 pipeline can reduce the harmful effects of adverse childhood experiences, and reduce the need for students to leave college for economic reasons. Cultivating social and institutional support for students in the form of quality guidance in secondary schools and supportive advising at the postsecondary level can help keep students on track with coursework and graduation. Ensuring that students have access to out-of-school time at the K-12 level; involvement in professional STEM organizations and other ethnic-based groups; and access to undergraduate research opportunities and learning communities at the postsecondary level cultivates essential peer and mentoring relationships, and helps students stay connected to school.


Promising Practices to Equip Rhode Island's HSIs to Support Hispanic Students along the P-20 Pipeline

Approximately two thirds of U.S. Hispanic students will enroll in an HSI. Rhode Island College (RIC) attained the designation of an HSI during the 2021-22 academic year and is currently the only HSI in the state of Rhode Island. Although total enrollment at Rhode Island College has fallen by 23% over the past ten years, Hispanic enrollment has more than doubled during that same time period (Cano-Morales, 2022). It is worth noting that even before receiving the HSI designation, RIC ranked in the top ten in the nation for closing the gap in graduation rates between white and Latino students (Martinez & Martinez, 2016). Yet RIC is graduating less than half of the first-year Hispanic students who enroll. Within six years of enrollment, most Hispanic students have not yet received an undergraduate degree. (See Figure 3.)

Figure 3. Percentage of Hispanic First-Year Students Graduating from Rhode Island College within 6 Years



Source: Rhode Island College Office of Institutional Research & Planning (2022). *Retention and Graduation Report*.



Persistence rates in STEM fields at RIC are sobering. Of the 2011-2015 cohort of undergraduate Hispanic STEM majors at RIC, only 8.3% completed their degree within four years compared to 18.5% of non-STEM majors, and only 28.3% completed within six years compared to 45.3% of non-STEM majors. More than 71% of STEM majors did not graduate from RIC within six years, compared to 54.7% of non-STEM majors. (See Table 4.)

Throughout this report we have pointed to research that shows students' financial stability and access to social and institutional supports are essential to students' ability to navigate and persist in school. In order for RIC to serve its students better, we need more complete data on their experiences with these factors.

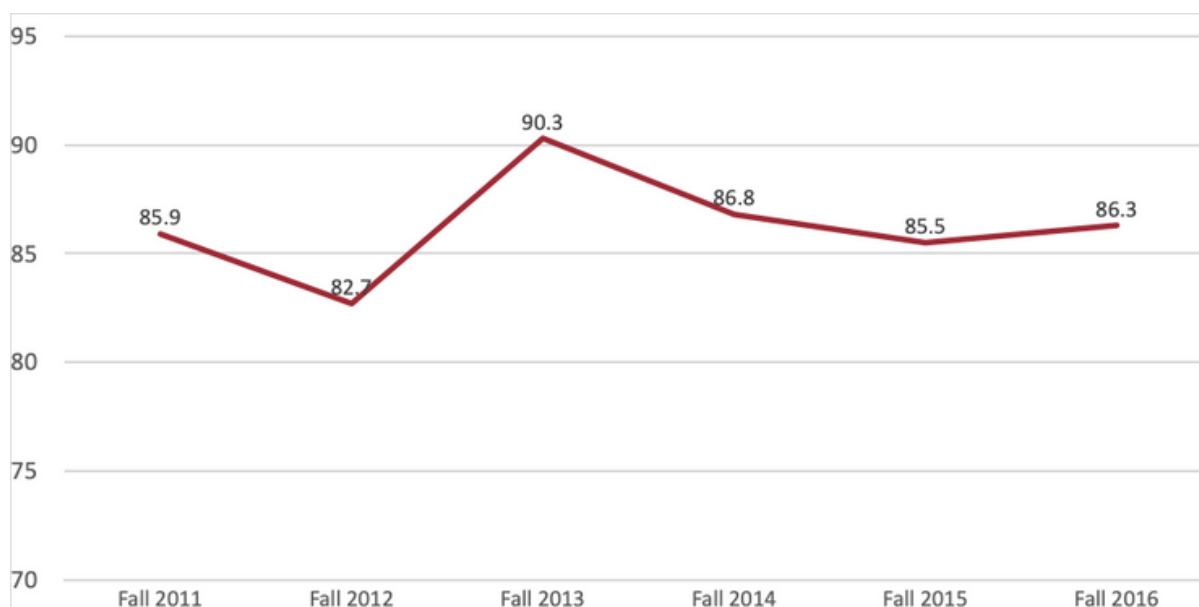
Table 4. Hispanic/Latinx Graduation Rates at Rhode Island College, Cohort 2011-2015

	4 Years or Less	5 Years	6 Years	Not Graduated
STEM Major	8.3%	20.4%	28.3%	71.7%
Non-STEM Major	18.5%	36.1%	45.3%	54.7%


Source: Rhode Island College Office of Institutional Research & Planning

Responding appropriately to students requires understanding them. Below is a snapshot of RIC's Hispanic population over the past several years. RIC's institutional data show that Hispanic students are primarily enrolled full time (see Figure 4). If national data is reflected at RIC, then most of these full-time students are likely working while enrolled. One study of Rhode Island College's Latino Student Success Pilot (LSSP) program noted that students expressed financial stress impacting their ability to finish college, made worse for non-citizens who could not get federal loans (Martinez & Martinez, 2016).

Figure 4. Percentage of Rhode Island College Latinx Students Enrolled Full Time, 2011-2016



Source: Rhode Island College Office of Institutional Research & Planning



We have limited data on the effectiveness of our social and institutional supports for students. We do know that between 2011-2016, on average, nearly 37% of Hispanic students entered RIC as a transfer student. In other words, more than one out of every three Hispanic students must navigate the process of entering RIC as a transfer student. Students who transfer institutions have to learn to navigate a new administrative structure. Some evidence shows that the structures at RIC are especially burdensome. The pilot study of the LSSP program found that students struggled with knowing who to contact for administrative issues (e.g., financial aid paperwork) and some expressed discomfort with their academic advisor (Martinez & Martinez, 2016). A recent RIC campus survey suggests that students at RIC continue to face challenges with advising and other institutional supports (Cano-Morales, 2022).

Among students in the LSSP, positive relationships with a professor yielded better performance in that course (Martinez & Martinez, 2016). This suggests that RIC faculty can improve the experiences of Hispanic students by focusing on how they respond to the needs of their students. Many Hispanic students require support to learn how to navigate the college experience, and most Hispanic students require financial support in order to finish.

Institutions of higher education are increasingly recognizing their responsibility to help bridge the gap between college readiness and high school proficiency. HSIs that take this responsibility seriously can take a number of steps to improve student preparedness and increase enrollment and graduation rates for Hispanic students in STEM fields.



Recommendations

Rhode Island stakeholders need to address the barriers identified in this report, take advantage of new opportunities, and deepen commitment to and investment in existing supports that have shown to make a positive difference for Hispanic students. Every recommendation at the K-12 level has a parallel recommendation at the postsecondary level (see Table 5).


Some of these recommendations require institutions to shift their priorities in other areas. For instance, teaching institutions tend to be less likely to provide the type of STEM laboratory experiences that will give Hispanic students the experiences they need; their faculty carry heavier teaching loads and lab space is dedicated to instructional purposes, leaving little opportunity for Hispanic students or faculty to engage in original laboratory research (HACU, n. d.). All programs must be sustainable and not rely on the good will of professors who are personally committed to the work. The work that faculty do also needs to be rewarded professionally, because commitment to support Hispanic students—and other historically underrepresented minority students—will necessarily shift their focus from traditional academic research. These initiatives are worth the investment if we hope to see equitable outcomes for Hispanic students in STEM.

Public IHEs also need to work more collaboratively and strategically with each other, with policymakers, and with the public to ensure adequate funding. Over the past few decades, the number of historically underrepresented minority students enrolling in public colleges and universities has increased while public funding for these institutions has declined. Such austerity measures have had a racialized impact on students of color enrolling in IHEs. Instead of

Table 5. Recommendations at the K-12 and Postsecondary Levels

At the K-12 Level	At the Postsecondary Level
<p>Reform the state funding formula for K-12 schools so that students with the greatest need receive ample resources. These resources may include wraparound services in under-resourced communities, mental health support for students experiencing trauma, and culturally competent and linguistically diverse teachers who are committed to raising student academic performance.</p>	<p>Provide financial support to postsecondary students who attend college part time. Many Hispanic students need to work to support their families, but most financial aid goes to full-time students. Offer flexible options for financial aid and work study for students who attend on a part-time basis.</p>
<p>Increase the number of Hispanic and culturally competent guidance counselors in middle and high school. Students need counselors who will support and guide them into rigorous STEM courses that prepare them for postsecondary success.</p>	<p>Increase the number of Hispanic and culturally competent faculty and staff. Hispanic students benefit from institutional agents who understand their needs and will help them navigate complex bureaucratic systems in higher education. Ideally, institutions like RIC will adopt “one-stop-shops” where students can have all of their questions addressed. In the meantime, faculty can help Hispanic students develop a clear plan to complete program requirements so that they can graduate on time. Faculty and staff can develop programming (e.g., college orientation sessions) that engages multilingual family members who can provide ongoing support to Hispanic students. Compensate and support faculty and staff for engaging in this important work.</p>

At the K-12 Level	At the Postsecondary Level
<p>Invest in dual language programs at the K-12 level. Dual language instruction in math and science courses can contribute to overall academic success. Dual language instruction preserves students' home language as they work to acquire a new language (e.g., English).</p>	<p>Institutionalize the value of Spanish language across college programs and offices. For instance, student career services needs to understand how to help students “market” their linguistic assets.</p> <p>IHEs in Rhode Island can support students by establishing and communicating clear guidelines for earning credits toward the state’s Seal of Biliteracy.⁵</p>
<p>Fund out-of-school-time (OST) programs at the K-12 level. OST helps students feel more connected to their peers and to school, which can help improve overall academic performance.</p>	<p>Develop faculty and staff to engage Hispanic students in undergraduate learning opportunities through research projects, learning communities, student organizations, and mentoring opportunities.</p>
<p>Use acceleration instead of remediation to close academic achievement gaps.</p>	<p>Revise remediation requirements for college gateway courses. Enroll students with few academic deficiencies in full-credit courses with co-requisite student supports built in.</p>



increasingly relying on, and competing for funding from private individuals, public IHEs should work collaboratively to demonstrate how state and federal investments in higher education address a number of public and societal needs—the kinds of needs that STEM education prepares students to address (Hamilton & Nielsen, 2021).

RIC's HSI committee identified additional recommendations in its 2021 report, which may be applicable to other institutions. These recommendations, which are too extensive to include here in full, fall under the categories of leadership, data, and practice. Under the category of leadership, the committee recommended establishing a permanent, standing HSI committee that will shepherd the work necessary to make RIC live up to its status as an HSI. Under the category of data, the committee recommended ensuring that RIC has comprehensive data on Hispanic students, faculty, and staff. This data should be disaggregated to represent the diversity of the Hispanic community by race, language, nationality, and other identities. Under the category of practice, the committee made recommendations to secure resources that explicitly support Hispanic students; use cluster hiring to increase the number of Hispanic faculty; revise curriculum so that it reflects the “institutional values that come with being an HSI”; and develop plans for Hispanic student success, including enrollment and retention strategies (HSI Committee, 2021). As the first HSI in Rhode Island, Rhode Island College has a unique perspective on how to meet the needs of Hispanic students. Other institutions that are working toward HSI designation should consider the work of RIC's HSI committee and review the full list of recommendations in its report.



Summary

The U.S. has been investing in STEM for decades, but not in a way that is equitable across demographic backgrounds. The recent focus on equity in education is promising, but much more needs to be done for Hispanic youth. Although access to STEM education at the K-12 level correlates with higher levels of college enrollment, we cannot simply enroll students in STEM courses and expect them to successfully matriculate to college as a result. For those who do graduate and enroll in college, we cannot leave them to navigate the system alone. Students need guidance counseling and a range of economic, mental health, and other supports to navigate both the secondary and postsecondary schooling experiences. Public institutions of higher education have a significant role to play, which includes partnering with K-12 schools to help ensure that there is a seamless transition to higher education. Public IHEs also need to work diligently, creatively, and collaboratively to secure public resources and invest them in the programs and people equipped to support Hispanic students in STEM.

End Notes

[1] This definition borrows language from the 1976 PL 94-311 which first mandated data collection for Hispanic people. See

<https://uscode.house.gov/statutes/pl/94/311.pdf>

[2] This study focused on first- and second-generation Hispanic high school students in Central Falls, Pawtucket, and Providence. See Brabeck (2020).

[3] In this study, 46% of first- and second-generation Hispanic high school students in Central Falls, Pawtucket, and Providence reported using alcohol, 24% reported using marijuana, 11% reported using other drugs, and 9% reported using cigarettes. See Brabeck (2020).

[4] Gateway courses are the first courses in a student's program of study that count for college credit.

[5] In 2022, Rhode Island passed a law requiring all public IHEs to award college credit to students who earned the state's Seal of Biliteracy. Students in Rhode Island can earn the Seal of Biliteracy by demonstrating competence in English language arts and one or more additional world languages. State law requires that students request the credit within three years after graduating high school. IHEs have the freedom to establish the criteria for world language course credit toward a language major, minor, or general education requirement. Learn more about the Seal of Biliteracy here:

<https://www.ride.ri.gov/Portals/0/Uploads/Documents/Diploma-System/Council%20Designations/Council-Designations-Seal-of-Biliteracy-RI.pdf>. Read the full legislation here:
<http://webserver.rilin.state.ri.us/BillText/BillText22/HouseText22/H7607.pdf>

References

- About HACU (n. d.). Hispanic Association of Colleges and Universities.
https://www.hacu.net/hacu/HACU_101.asp
- Anderson, S. G., & Blankenberger, B. (2023). Validation and living learning communities: An evaluation case study. *Journal of College Student Retention: Research, Theory & Practice*, 25(1), 76–100.
<https://doi.org/10.1177/1521025120970934>
- Bensimon, E. M., Dowd, A. C., Stanton-Salazar, R., & Dávila, B. A. (2019). The role of institutional agents in providing institutional support to Latinx students in STEM. *The Review of Higher Education*, 42(4), 1689–1721.
<https://doi.org/10.1353/rhe.2019.0080>
- Brabeck, K. (2020). *School-based mental health support for Rhode Island youth: Policy recommendations to address students' exposure to adverse childhood experiences*. Social Policy Hub for Equity Research in Education.
- Cano-Morales, A. (2022, November). HSI@RIC [Slides Presentation]. HSI Working Group/Office of Diversity, Equity, and Inclusion, Rhode Island College.
- Complete College America (2012, April). *Remediation: Higher education's bridge to nowhere*.
<https://completecollege.org/wp-content/uploads/2017/11/CCA-Remediation-final.pdf>
- Eddy, Edward D. (1993, May). *Imagine...Providence blueprint for education. The report of the PROBE Commission*. Public Education Fund.
- Frederick, A., Grineski, S. E., Collins, T. W., Daniels, H. A., & Morales, D. X. (2021). The emerging STEM paths and science identities of Hispanic/Latinx college students: Examining the impact of multiple undergraduate research experiences. *CBE-Life Sciences Education*, 20(2). <https://doi.org/10.1187/cbe.20-08-0191>
- Gándara, P. (2017). The potential and promise of Latino students. *American Educator*, 4-43.
- Garcia, G. A., & Ramirez, J. J. (2015). Institutional agents at a Hispanic Serving Institution: Using social capital to empower students. *Urban Education*, 53(3), 355–381. <https://doi.org/10.1177/0042085915623341>
- Goss, A. C. (2020). *2020 Rhode Island education policy primer*. Social Policy Hub for Equity Research in Education.

Gottfried, M. A., & Bozick, R. (2016). Supporting the STEM pipeline: Linking applied STEM course-taking in high school to declaring a STEM major in college. *Education Finance and Policy*, 11(2), 177-202.

Hamilton, L. T., & Nielsen, K. (2021). *Broke: The racial consequences of underfunding public universities*. The University of Chicago Press.

Hinojosa, T., Rapaport, A., Jaciw, A., LiCalsi, C., & Zacamy, J. (2016). *Exploring the foundations of the future STEM workforce: K-12 indicators of postsecondary STEM success*. Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Southwest.

Hispanic Association of Colleges and Universities (HACU). (n.d.). *Rethinking policy and practice for STEM education: New Hispanic perspectives*. https://www.hacu.net/hacu/HSIs_and_STEM.asp

Hispanic Serving Institution Committee Report. (2021). Rhode Island College.

Johns Hopkins Institute for Education Policy (2019). *Providence Public School District: A Review*.

Kennedy, B., Fry, R., & Funk, C. (2021). 6 facts about America's STEM workforce and those training for it. Pew Research Center. <https://www.pewresearch.org/fact-tank/2021/04/14/6-facts-about-americas-stem-workforce-and-those-training-for-it/>

Kennedy, T.J., & Odell, M. R. (2014). Engaging students in STEM education. *Science Education International*, 25, 246-258.

Krogstad, J. M. (2016). 5 facts about Latinos and education. Pew Research Center. <https://www.pewresearch.org/fact-tank/2016/07/28/5-facts-about-latinos-and-education/>

Lane, T. B. (2016). Beyond academic and social integration: Understanding the impact of a STEM enrichment program on the retention and degree attainment of underrepresented students. *CBE-Life Sciences Education*, 15(3).

Martinez, J. and Santiago, D. (July 2020). *Tapping Latino talent: How HSIs are preparing Latino students for the workforce – Covid-19 update*. Washington, D.C: Excelencia in Education.

Martinez, B. C., & Martinez, M. J. (2016). *Latino student success pilot at Rhode Island College: Research findings and recommendations*. Annenberg Institute for School Reform.

Murphey, D., Guzman, L., & Torres, A. (2014). *America's Hispanic children: Gaining ground, looking forward*. Child Trends. <https://www.childtrends.org/wp-content/uploads/2014/09/2014-38AmericaHispanicChildren.pdf>

Museus, S. D., Palmer, R. T., Davis, R. J., & Maramba, D. C. (2011). Racial and ethnic minority students' success in STEM education. *ASHE Higher Education Report*, 36(6), 1-140.

Nuñez, A., & Bowers, A. J. (2011). Exploring what leads high school students to enroll in Hispanic-Serving Institutions: A multilevel analysis. *American Educational Research Journal*, 48(6), 1286-1313.

Ogut, B., Circi, R., & Yee, D. (2021). *Why does high school coursework matter? The case for increasing exposure to advanced courses*. American Institutes for Research.

Okrent, A., & Burke, A. (2021, August). *The STEM labor force of today: Scientists, engineers, and skilled technical workers*. Science & Engineering Indicators. nces.nsf.gov.

Revelo Alonso, R. A. (2015). *Engineering familia: The role of a professional organization in the development of engineering identities of Latina/o undergraduates* (Publication No. 3737953) [Doctoral dissertation, University of Illinois at Urbana-Champaign]. ProQuest Dissertations.

Rhode Island Public Expenditure Council (RIPEC) (2022). *Rhode Island's funding formula after ten years: Education finance in the Ocean State*.

SACNAS (2021). Fact Sheet.

[https://fs.hubspotusercontent00.net/hubfs/19842608/Document%20Files%20\(pdf,%20doc,%20xlsx\)/Factsheet.Supplementals.Sacnas.2021.final_.pdf](https://fs.hubspotusercontent00.net/hubfs/19842608/Document%20Files%20(pdf,%20doc,%20xlsx)/Factsheet.Supplementals.Sacnas.2021.final_.pdf)

Santiago, D. A., Taylor, M., & Galdeano, E. C. (2015). *Finding your workforce: Latinos in science, technology, engineering, and math (STEM)*. Washington, D.C.: Excelencia in Education

Watson, A. D., & Watson, G. H. (2013). Transitioning STEM to STEAM: Reformation of engineering education. *Journal for Quality and Participation*, 36(3), 1-5.

The background of the entire page is an abstract geometric pattern. It consists of numerous red cubes of various sizes, some of which are 3D-rendered to show depth. These cubes are interconnected by a network of thin, grey, angular lines that create a sense of a complex, interconnected structure. The overall aesthetic is modern and architectural.

**R H O D E
I S L A N D
C O L L E G E**

**SOCIAL POLICY HUB FOR
EQUITY RESEARCH IN EDUCATION**